Fact Sheet for State Waste Discharge Permit ST0004502

200 Area Treated Effluent Disposal Facility

February 17, 2022

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed State Waste Discharge permit for the 200 Area Treated Effluent Disposal Facility (200 Area TEDF – see Appendix C for acronyms) that will allow discharge of wastewater to two adjacent five-acre infiltration basins near the 200 Area of the United States Department of Energy (USDOE) Hanford Site.

State law requires any industrial facility to obtain a permit before discharging waste or chemicals to waters of the state, which includes groundwater.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the 200 Area TEDF, State Waste Discharge permit ST0004502, are available for public review and comment from February 22, 2022, until the close of business March 24, 2022. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

USDOE reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions about the facility's location, history, product type or production rate, discharges or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this fact sheet as **Appendix E, Response to Comments**, and publish it when we issue the final State Waste Discharge permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

Ecology proposes to renew a State Waste Discharge permit, which will continue to allow discharge of wastewater via infiltration through soils to the groundwater of the state. The Applicant is the United States Department of Energy, Office of River Protection (DOE-ORP). The disposal facility is the 200 Area TEDF. The facility is located in and near the 200 East and West Areas of the Hanford Site and consists of a twelve (12)-mile-long pipeline, three lift stations, a sample station (Building 6653), and two adjacent five-acre infiltration basins.

The draft permit complies with the regulatory requirements of Chapter 173-200 of the Washington Administrative Code (WAC), *Water Quality Standards for Groundwaters of the State of Washington*. This regulation is premised on the fact that all contaminants should be regulated to protect all existing and future beneficial uses of the groundwater. Since the use of drinking water is the most restrictive and protective, this regulation and the draft permit protects the groundwater for drinking water purposes. The draft permit establishes enforcement limits for nonradioactive contaminants or maximum allowable concentration levels in the effluent and/or groundwater.

This proposed permit does not cover any radioactivity or radionuclide parameters which are considered to be a source, a byproduct, or special nuclear materials that are controlled by the USDOE under the Atomic Energy Act (AEA) in accordance with provisions of USDOE Order 458.1, "Radiation Protection of the Public and the Environment." DOE-ORP will regulate and monitor the release of radionuclides to the environment pursuant to the AEA. DOE-ORP plans to meet the intent of 40 Code of Federal Regulations (CFR) Part 141, *National Primary Drinking Water Regulations*, regarding radioactive contaminants, and plans to take investigative and mitigating steps if the discharge exceeds drinking water standards. The facility monitors and reports radionuclide concentrations in the effluent to Ecology. Therefore, gross alpha, gross beta, and tritium are not assigned enforcement limits but are monitored and reported for informational purposes.

Several of the effluent limits for parameters in this permit have been lowered from the previous permit effluent limits and are still below the Groundwater Quality Criteria but will remain above background groundwater quality. The Anti-degradation policy requires discharges for parameters above background groundwater quality to be provided All Known, Available, and Reasonable Treatments (AKART) and for the permittee to demonstrate overriding public interest in the discharge. The effluent limits for these parameters are set at the concentration reported in the permittee's Best Available Technology/All Known, Available and Reasonable Treatments (BAT/AKART). The Permittee has demonstrated that discharges to the 200 Area TEDF are necessary to support clean-up and remediation priorities on the Hanford Site. The 200 Area Treated Effluent Disposal Facility (Project W-049H) was agreed upon through Consent Order No. DE 91NM-177. On April 18, 1995, the original state waste discharge permit for the 200 Area Treated Effluent Disposal Facility (Project W-049H) was issued. Milestone M-017-08, *Initiate full-scale hot operations for '200 Area Treated Effluent Disposal Facility' (TEDF) (Project W-049), with permitted disposal of effluent to either the soil column or surface water*, of the Hanford Federal Facility Agreement and Consent Order (HFFACO), was completed on May 31, 1995. As reported in WHC-SD-W049H-ER-003, the option to discharge treated waste streams to a single, central, and optimum site location was chosen. TEDF was intentionally located to protect the groundwaters of the state. TEDF was constructed away from contaminated areas to prevent the mobilization of contamination in the vadose zone to the groundwater and to protect the Columbia River. The discharges to TEDF also provides a hydraulic barrier to the existing upgradient contamination on the Hanford Site Central Plateau.

Proposed changes to this draft permit include:

- Removal of the 283E and 283W Package Boilers from the list of facilities authorized to discharge to the 200 Area TEDF. These Boiler Annexes, as well as 2225B Boiler Annex, were permanently removed from service through the Department of Energy, Richland Operations Office (DOE-RL) letter to Ecology, 10-EMD-0084, dated August 12, 2010.
- A reduction in calibration frequency of conductivity and pH monitoring devices at the 200 Area TEDF from weekly to monthly.
- The calibration frequency for the flow meter at the 200 Area TEDF is maintained at the annual frequency from the previous permit, which was established using best engineering practices and flow monitoring records.

- A clarification that the Permittee must quantify daily flow when continuous monitoring is not possible, rather than sampling daily. Daily sampling for flow is not possible at 200 Area TEDF, so if the flowmeter at 200 Area TEDF is down for a day or longer, discharge flow can be determined by summing the changes in pump station volumes and the flows from the direct transfer streams (e.g., 242-A Evaporator, Waste Encapsulation Storage Facility, and the Waste Treatment and Immobilization Plant [WTP]).
- A reduction in the average monthly effluent limit for Bis (2-ethylhexyl) phthalate from 10 µg/L to 6 µg/L. This reduction aligns the permit limit with the Groundwater Quality Criteria of WAC 173-200.
- A reduction in the average monthly effluent limit for arsenic (total) from 15 µg/L to 12 µg/L, aligning the limit with the Hanford Site 95th percentile background groundwater concentration (DOE/RL-96-61, Rev. 0) for arsenic.
- A reduction in the average monthly effluent limit for cadmium (total) from 5 µg/L to 3 µg/L, aligning the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) concentrations for cadmium.
- A reduction in the average monthly limit for chromium (total) from 20 µg/L to 16 µg/L, aligning the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) concentration for chromium.
- A reduction in the average monthly effluent limit for lead from 10 µg/L to 6 µg/L, aligning the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) concentration for lead.
- Adding an allowance for excursions in the average monthly effluent limit for iron.
- Adding an allowance for excursions in the average monthly effluent limit for pH.
- Adding hexavalent chromium as a parameter to be monitored in the wastewater effluent.
- Removing the Plutonium Finishing Plant from the list of authorized dischargers.
- Adding the 283E Water Treatment Facility Complex.
- Adding the 241-A-285 Water Services Building.
- Combining the 283W Water Treatment Facility and the new 283WR Water Treatment Facility into the 283W Water Treatment Facility Complex.

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I. INTRODUCTION

The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in the Water Pollution Control law, chapter 90.48 Revised Code of Washington (RCW).

Ecology adopted rules describing how it exercises its authority:

- State Waste Discharge Program (chapter 173-216 WAC).
- *Water Quality Standards for Groundwaters of the State of Washington* (chapter 173-200 WAC).
- *Submission of Plans and Reports for Construction of Wastewater Facilities* (chapter 173-240 WAC).

These rules require any industrial facility owner/operator to obtain a State Waste Discharge permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the State Waste Discharge permit program and in response to a complete and accepted permit application, Ecology generally prepares a draft permit and accompanying fact sheet and makes them available for public review before final issuance. If the volume of the discharge has not changed or if the characteristics of the discharge have not changed Ecology may choose not to issue a public notice. When Ecology publishes an announcement (public notice); it tells people where they can read the draft permit, and where to send their comments, during a period of thirty days. (See **Appendix A-Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft State Waste Discharge permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

II. BACKGROUND INFORMATION

Table 1 General Facility Information

Facility Information	
Applicant	United States Department of Energy, Office of River Protection
Facility Name and Address	200 Area Treated Effluent Disposal Facility 200 East Area on the Hanford Site 2440 Stevens Center Place, MSIN H6-60 Richland, Washington 99354
Contact at Facility	Name: Richard Valle Telephone #: (509) 376-7256

Table 1 General Facility Information

Facility Information	
Responsible Official	Name: Brian Vance Title: Manager, USDOE, Office of River Protection Address: 2440 Stevens Center Place, Richland, Washington 99354 Telephone #: (509) 372-2315 FAX #: (509) 372-0712
Industry Type	Clean-up Site
Type of Treatment	200 Area TEDF does not provide any treatment. The system collects, conveys, and disposes of treated effluent from various facilities in the 200 Areas of the Hanford Site.
SIC Codes	9511
NAIC Codes	924110, Air, Water, and Solid Waste Management
Facility Location	Latitude: 46.55139 Longitude: -119.47564
Legal Description of Application Area	Section, township, range S5, T12N, R27E
Permit Status	
Renewal Date of Previous Permit	07/01/2012
Date of Ecology Acceptance of Application	05/23/2017
Application for Permit Renewal Submittal Date	06/27/2016 Updated application submitted 12/12/2019
Inspection Status	
Date of Last Non-sampling Inspection Date	06/15/2011*

*Due to Coronavirus Disease 2019 (COVID-19) site-access restrictions an inspection was not able to be performed prior to permit renewal. An inspection will be conducted during the permit term.

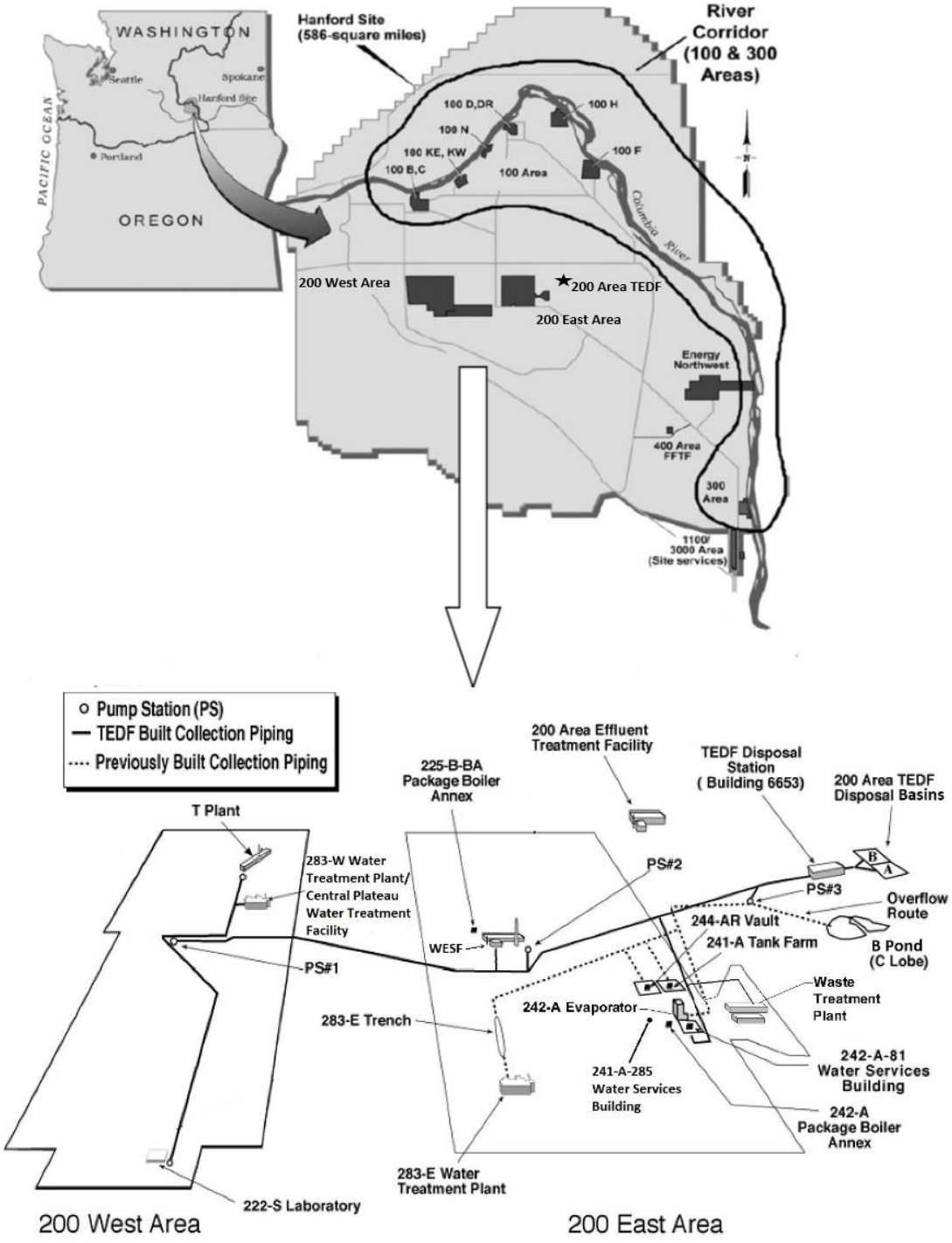

Figure 1 Facility Location Map

Figure 2 A Basin – 200 Area Treated Effluent Disposal Facility

Figure 3 B Basin – 200 Area Treated Effluent Disposal Facility

A. Facility Description

History

The 200 Area TEDF is a piped collection system that receives wastewater from multiple on-site generators and does not have any treatment or retention capacity. Strict controls at the generating facilities are essential to operate in compliance with the permit. Requirements and responsibilities for operation of generators discharging liquid effluents to the 200 Area TEDF are controlled by interface control procedure documents. The facility is located in and near the 200 East and West Areas of the Hanford Site and consists of a twelve (12)-mile-long pipeline, three lift stations, a sample station (Building 6653), and two adjacent five-acre infiltration basins. Water in close proximity to the basins is found as groundwater at a depth of about 140 feet below the surface. The disposal site was selected to avoid potential mobilization of contaminants from historical disposal practices or potential impacts to historical, archaeological, and cultural resources. Computer modeling of groundwater flow provides an estimated travel time of approximately 120 to 300 years for the effluent to reach the Columbia River (PNNL-13032).

As a requirement for obtaining the original State Waste Discharge permit, DOE-RL, the facility owner at the time, had to eliminate or reduce the contaminant loading in the effluent by applying AKART prior to its discharge to the environment. In addition, the facility applied AKART to reduce the volume of the effluent. DOE-RL also incorporated this program of pollution prevention, effluent treatment prior to discharge into the 200 Area TEDF system, and facility construction and operation as a portion of Milestone 17 in the 1989 HFFACO between DOE, the U.S. Environmental Protection Agency (EPA), and Ecology. The HFFACO further requires that the best available technology that is economically achievable be applied to the effluent. An extensive engineering report (WHC-SD-W049H-ER-003) describes all of the source controls, technology improvements, operational changes, and treatment technologies applied at all of the original facilities discharging to the 200 Area TEDF to clean up the effluent and reduce its volume. Compliance inspections conducted by Ecology officials documented the implementation of the required improvements by the facility.

Because of this multi-year effort, the facility reduced the toxic mass of contaminants in the effluent from the original facilities by approximately 85%. It projected a total cost of pollution prevention and disposal of $20 million. When the 200 Area TEDF became operational in 1995, the original contributing effluent streams no longer discharged to their prior disposal sites. The 200 Area TEDF project combined the individual effluent streams from several Hanford facilities, which then discharged to the disposal facility. The facilities originally included were the Plutonium Finishing Plant, T Plant, 222-S Laboratory, 284-W Power Plant, B Plant, 242-A-81 Water Services Building, and the PUREX facility. The original permit provided for the addition of a limited quantity of future potential effluent streams, provided they did not contain new contaminants and the discharge met all permit conditions.

During the early years of operation, the facility added new streams including the W-252 streams in 1997. The W-252 streams included discharges from the 242-A Evaporator, the 241-A Tank Farm Complex, the 284-E Power Plant, the B Plant, and the 244-AR Vault. Controls on the W-252 streams are discussed in the engineering report, *Phase II Liquid Effluent Program (Project W-252) Wastewater Engineering Report and BAT/AKART Studies* (WHC-SD-W252-ER-001, Rev. 0) and in subsequent engineering change notices to the report.

The wastewater effluent consists of individual waste streams from several Hanford facilities. All of these individual waste streams are generated from uses that do not involve direct contact of the water with industrial processes. These uses are primarily those associated with ventilation, heating, and cooling systems for the buildings; steam condensate from heating potable (drinkable) water; condensate of pressurized potable water; rainwater; and untreated Columbia River water. The current owner/operator, DOE-ORP, operates an extensive program of source controls (pollution prevention) to eliminate or reduce approximately 85% of prior contaminant loadings. Effluent treatment systems have also been constructed at some of the facilities that discharge to the 200 Area TEDF.

The current list of facilities, authorized by the existing (Ecology 2012) permit to discharge to 200 Area TEDF, include the following:

- Plutonium Finishing Plant Wastewater.
- T Plant Wastewater.
- 222-S Laboratory Complex Wastewater.
- Waste Encapsulation Storage Facility (WESF) Liquid Effluent and Cooling Water.
- 242-A-81 Water Services Wastewater.
- 242-A Evaporator Cooling Water.
- 242-A Package Boiler Annex Wastewater.
- 242-A Evaporator Steam Condensate.
- 241-A Tank Farm Cooling Water.
- Miscellaneous Streams covered by State Waste Discharge Permit ST0004511.
- Discharges from WTP located in the 200 East Area.

The proposed permit removes the Plutonium Finishing Plant from the list of authorized dischargers, and adds the 283E Water Treatment Facility Complex, adds the new 283WR Water Treatment Facility (combined with the 283W Water Treatment Facility named as the 283W Water Treatment Facility Complex), and the 241-A-285 Water Services Building.

The addition of wastewater from the WTP to the 200 Area TEDF was a major new water stream added under the 2012 permit renewal. Discharges from testing at WTP may start as soon as 2022 to support Direct Feed Low Activity Waste commissioning. This includes discharges from the cooling towers and discharges from supporting operations. Discharges from the WTP will include discharges from the:

- Pretreatment Facility.
- Water Treatment Building, Analytical Laboratory.
- High Level Waste and Low Level Waste Facilities.
- Steam Plant Facility, Chiller/Compressor Plant.
- Wet Chemical Storage Facility.
- Maintenance Shop.
- PTF Chiller Plant and Cooling Tower.

- WTP Water Treatment Building.

DOE-RL prepared and submitted a BAT/AKART engineering study specific to the WTP to Ecology in October 2003 as part of the permit application for ST0004502 (04-RCA-0003) and to complement the 1992 engineering study (WHC-SD-W049H-ER-003) for the other 200 Area facilities. The WTP study recommended a source control that included the use of a reverse osmosis (RO) unit for production of demineralized water from steam production and other plant processes, as well as operation of the cooling towers at an average of five cycles of concentration. The WTP study concluded that the treatment facility will meet the effluent limits of the ST0004502 permit with the exception of total dissolved solids (TDS). The report recommended that Ecology increase the monthly average limit for TDS in the ST0004502 permit from 250 mg/L to 500 mg/L Ecology reviewed the WTP study and made a determination to increase the monthly average limit for TDS in the permit to 500 mg/l, which is the maximum allowable limit under WAC 173-200 (*Water Quality Standards for Groundwaters of the State of Washington*). Ecology also determined a need to evaluate performance on discharges generated by WTP during this permit cycle. The variability study described in Special Condition S9 serves this purpose. Ecology will evaluate performance of the system at the next permit issuance and determine performance-based permit limits.

The WTP BAT/AKART Addendum #1 (04-RCA-0017) identified three changes to the original study; it:

1. Added biocides and added a process to treat the increased concentrations of total trihalomethanes (THMs), which would exceed the ST0004502 effluent limit.
2. Changed the source water from raw water to potable water as the primary source for WTP. Potable water would eliminate the need for on-site treatment of corrosion products in raw water piping.
3. Identified the WTP start date for full operation.

WTP BAT/AKART Addendum #2 (04-AMCP-0184) described the selection of air stripping as the technology for removing THMs. It also provided revised source water composition and the non-radioactive liquid waste disposal (NLD) effluent flow rates and composition.

WTP BAT/AKART Addendum #3 (11-EMD-0040) submitted in December 2010, provided updated WTP design information affecting the WTP NLD to the 200 Area TEDF which included expansion of the WTP Water Treatment Facility and planned construction of a new Chiller Plant/Cooling Tower supporting the Pretreatment facility. DOE-RL estimated a total flow rate of the NLD effluent discharged from WTP to 200 Area TEDF at a maximum of 396 gallons per minute (gpm). It expects that the composition of the effluent would not meet Water Quality based effluent limits set according to the Anti-degradation policy for Cadmium, Chromium and Lead. Effluent limits for Cadmium, Chromium and Lead are provided AKART and will be set at the concentration provided in 11-EMD-0040.

Because this is a significant new waste stream from a newly constructed facility, Ecology included the requirement to submit a study of effluent variability to evaluate the listed constituents in the effluent. Part V, section G of this fact sheet discusses the 200 Area TEDF Variability Study required under Special Condition S9.

To support the proposed addition of the 283WR Water Treatment Facility, Ecology requested the Permittees prepare a BAT/AKART analysis evaluating the treatment options for minimizing disinfection byproducts (DBPs) in the effluent. The 283WR Water Treatment Facility BAT/AKART analysis (HNF-ENG-64305, Rev. 0) describes the configuration options expected to minimize DBPs, as well as salts and total dissolved solids. The analysis also provides several short- and long-term options for managing DBPs, which Ecology approved on the condition that the Permittees are prepared to implement such management options. The waste stream is considered a Significant New Source, so the requirements for an effluent variability study will be fulfilled as required by Special Condition S9 once the facility is operational.

Industrial Processes

Most of the effluent streams discharged to the 200 Area TEDF are generated from uses that do not involve direct contact of the water with industrial processes. No manufacturing processes or products are associated with the individual effluent streams. Uses that generate the effluent are primarily those associated with the following:

- Ventilation, heating, and cooling systems for the buildings.
- Steam condensate from heating potable (drinkable) water.
- Condensate of pressurized softened or deionized potable water.
- Rainwater from parking lots and exterior paved areas.
- Potable (treated) water.
- Untreated Columbia River water.
- Boiler blowdown.
- Floor drains with limited and strictly controlled usage.
- Hydrotest, maintenance, construction, cooling water, condensate, and stormwater discharges that are covered by Hanford State Waste Discharge permit ST0004511.
- RO brine.
- RO permeate.
- Air Stripping.

Wastewater Treatment Processes (Prior to Land Treatment)

The 200 Area TEDF is a pipeline with three pump stations that convey effluent from several generating facilities to infiltration basins, and does not provide any treatment. The effluent discharges into either A Basin or B Basin. The facility plans to rotate basins on a monthly basis. Ecology reviewed and approved engineering specifications and plans before construction. A summary of the major activities conducted at some of the generating facilities is included below. However, note that the effluent discharged under this draft permit is generated from the limited activities listed in the preceding section, *Industrial Processes*. Hence the effluent is not subject to contamination from other activities at the following facilities.

- Plutonium Finishing Plant Effluent.

  As of February 2020, demolition of the Plutonium Finishing Plant is in its final stages. Discharges from this facility ceased and no further inputs to the 200 Area TEDF system are authorized by the proposed permit.

- 222-S Laboratory Effluent.

  The 222-S Laboratory's primary function is to provide chemical and radiological analyses of samples associated with ongoing Hanford Site operations and research programs. Source controls were implemented as BAT/AKART for the 222-S Laboratory's effluent. Improvements included piping and equipment changes to reduce the potential for contamination; adding new retention tanks; eliminating steam cell heaters to avoid condensate generation; and replacing heating, ventilation, and air conditioning air washes with electric chillers to eliminate blowdown effluent. The laboratory sends spent reagents to both on-site and off-site Treatment, Storage, and Disposal Facilities and does not discharge them to the 200 Area TEDF.

- T Plant Effluent.

  The T Plant provides decontamination services, waste verification, and other waste handling activities for the Hanford Site. Source controls with retention/diversion capabilities were implemented as BAT/AKART for the T Plant's effluent. Water-cooled air compressors were replaced with air-cooled units, and the water-cooled pressurized water reactor chiller was replaced with an air-cooled, refrigerant cooling system. Stored chemicals were removed and sumps and drains were sealed. The associated laboratory is no longer active and is not a source of wastewater.

- Waste Encapsulation Storage Facility.

  Currently, WESF ensures safe storage and management of radiological and chemical waste inventories. WESF also stores chemicals and discharges cooling water, rainwater, raw water, and potable water to 200 Area TEDF.

- 242-A-81 Water Services Building Effluent.

  The 242-A-81 Water Services Building houses equipment that strains coarse, suspended solids from untreated Columbia River water. Periodic flushing (backwashing) of the filtering media is required to cleanse the material, and results in an effluent. Ecology determined that prior pollution prevention controls were adequate at the 242-A-81 Water Services Building.

- 241-A-285 Water Services Building.

  The 241-A-285 Water Services Building was constructed to provide water to support tank retrieval operations. The building construction is complete including the tie-in to a line connected at the TEDF H-1 manhole. Potential sources from the building sump include pressure relief valve failure, water tank overflow, or backflow preventer draining. These raw water sources are managed as a ST0004511 (Ecology 2013) discharge to TEDF but are proposed to be managed in this permit as an authorized discharge.

- 242-A Evaporator.

  The 242-A Evaporator is used to reduce the volume of waste stored in underground tanks on the Hanford Site. The Evaporator discharges a large volume of non-contact cooling water to the 200 Area TEDF when the facility is supporting tank farm operations. Typically these evaporator campaigns will operate a few weeks per year.

- 241-A Tank Farm Cooling Water.

  The 241-A Tank Farm Cooling Water System has been taken out of service. The source included four 702-AZ Cooling Towers. Each cooling tower was part of a tertiary cooling system for a ventilation system used for cooling hazardous and radioactive wastes stored in underground storage tanks. The 702-AZ evaporative cooling towers have been taken out of service and have not routinely discharged to TEDF since 2010. Each tower is equipped with a floor drain in the concrete where the excess cooling water was discharged to TEDF. This floor drain is still active and could receive water from excess snowmelt or rainwater.

- 283W Water Treatment Facility Complex.

  The 283W Water Treatment Facility Complex includes the 283W Water Treatment Facility, the 283WR Water Treatment Facility and associated support facilities, including the 282W reservoirs, 282WC pump house, 283WA sanitary water tank, 283WE sludge lagoons, 283WB equalization basin, 283WC solid contact clarifier tank, 283WD recycle pump station, 283WF sample building, 283WG sanitary water tank and 282WA water inlet house.

  - 283W Water Treatment Facility.

    The 283W Water Treatment Facility has provided potable (drinking) water to Hanford's Central Plateau since 1944. The facility treats raw Columbia River water through use of filtration and chlorine injection. Discharges to the 200 Area TEDF system include potable and raw water. Discharges from this facility will cease once the 283WR Water Treatment Facility is operational. All of the supporting facilities for 283W will remain in use when 283WR is completed.

  - 283WR Water Treatment Facility.

    Construction of the 283WR Water Treatment Facility is slated to begin in Fiscal Year 2022. This new facility is intended to replace the existing 283W Water Treatment Facility. The facility will provide potable water for the Central Plateau, and will support Direct Feed Low-Activity Waste (DFLAW) operations. Proposed discharges to the 200 Area TEDF system include membrane and strainer backwash, membrane feed flush, cleaning solution and rinse waters (softened, chlorinated potable water). The BAT/AKART Analysis (HNF-ENG-64305) for the new facility was submitted to Ecology on December 12, 2019. The BAT/AKART analysis provided operational flexibility and options that can be implemented to manage trihalomethane and chloroform concentrations.

- 283E Water Treatment Facility Complex.

  The 283E Water Treatment Facility Complex includes the 283E water filtration plant and associated support facilities, including the 282E raw water reservoir (overflow could potentially go to 200 Area TEDF), 282EA north water reservoir inlet house, 282EB south water reservoir inlet house, 282EC pump house, 283EA sanitary water tank, and 283EG sanitary water tank. The 283E Water Treatment Facility provided filtered raw water to Hanford's Central Plateau up to the year 2000. The facility currently provides clearwell and pumping functions. Online instrumentation requires continuous discharges. Discharges to the 200 Area TEDF system include raw water and sanitary wastewater.

- Waste Treatment and Immobilization Plant.

  Construction of the WTP initiated in 2001 and full operation for dangerous waste/mixed waste treatment is scheduled to begin in 2030. The WTP mission is to vitrify tank waste stored in the 200 Area tanks. WTP generates a NLD effluent stream which discharges to the 200 Area TEDF. Cooling tower blowdown and RO brine are the primary WTP wastewater contributions to the 200 Area TEDF. Other minor sources include reverse osmosis permeate, non-dangerous, non-radioactive wastewater from sumps, steam condensate, and boiler blowdown. Discharge of the reverse osmosis permeate, which is expected to discharge only once every five years or during non-routine maintenance, is not an authorized discharge under this permit, but may be authorized on a case-by-case basis under Special Condition S8. Source controls and end-of-pipe treatment are BAT/AKART for the WTP effluent. The USDOE installed an air stripper to remove Trihalomethanes, such as chloroform. These Trihalomethanes are a by-product of treating source water with chlorine.

Collection System Status

The 12-mile-long pipeline constructed to collect and convey the effluent to the infiltration basins was tested for integrity prior to use. Older, pre-existing ancillary pipelines at individual facilities have been cleaned or replaced if determined to be a potential source of contamination from deposition of contaminants that were the result of past practices. The collection system also includes three pump stations. Pump Station #1 is located in the 200 West Area approximately 1/4 mile south of 19th street. Pump Station #2 is located in the 200 East Area near B Plant. Pump Station #3 is in the 200 East Area near the 200 Area TEDF Sample Station, and serves the 242-A Evaporator. Inputs to the system are limited in nature, documented, and strictly controlled. All access points to the system are strictly controlled and operated by trained personnel.

Land Treatment and Distribution System (Infiltration Basins)

The 200 Area TEDF is a collection system and two infiltration/disposal basins of approximately five acres in size, each. The infiltration/disposal basins are called A Basin and B Basin. The infiltration systems are capable of handling the planned design flows per WHC-SD-W049H-ER-003, Revision 0, *200 Area Treated Effluent Disposal Facility (Project W-049H) Wastewater Engineering)*. These basins are located on the Hanford Site, east of the 200 East Area. The Hanford Site is located within the semiarid Pasco Basin of the Columbia Plateau in south-central Washington State. The Hanford Site occupies an area of about 586 square miles northwest of the confluence of the Snake and Yakima rivers with the Columbia River. It comprises an area of

about 30 miles north to south, and 24 miles east to west. Public access is restricted and the large area provides a buffer for the smaller areas currently used for storage of nuclear materials, waste storage, and waste disposal. The USDOE actively uses or has disturbed about 6% of the total land area.

The Columbia River flows through the northern part of the Hanford Site. It then turns south and forms part of the Site's eastern boundary (see Figure 1). The Yakima River runs along part of the southern boundary and joins the Columbia River below the City of Richland. Richland borders the Hanford Site on the southeast. Rattlesnake Mountain, the Yakima Ridge, and Umtanum Ridge form the southwestern and western boundaries of the Hanford Site. The Saddle Mountains form the northern boundary. Two small east-west ridges, Gable Butte and Gable Mountain, rise above the plateau of the central part of the Hanford Site. Adjoining lands to the west, north, and east are principally range and agricultural lands. The cities of Richland, Kennewick, and Pasco constitute the nearest population centers and are located southeast of the Hanford Site.

The Hanford Site encompasses more than 3,000 waste management units and four groundwater contamination plumes that have been grouped into 44 operable units. The 200 Area TEDF is located near the center of the Hanford Site, approximately two miles east of the eastern boundary of the 200 East Area. The USDOE chose this site because area soils were essentially uncontaminated. Modeling indicates that additional infiltration would not mobilize contaminants or contribute to contamination plume migration originating from other locations.

Description of the Groundwater

The 200 Area TEDF is underlain by geologically young sediments that, in turn, are underlain by bedrock. The bedrock is Columbia River Basalt, at a depth of about 250 feet below the surface. The bedrock slopes gently (approximately one-half of a degree) toward the south-southwest. The sediments that lie immediately above the basalt are called the Ringold Formation. The Hanford formation lies above the Ringold Formation. Alluvium and dune sand cover part of the surface of the site. The alluvium and dune sand are approximately 0 to 10 feet thick at the surface.

The upper part of the Hanford formation consists of highly permeable, unconsolidated gravel. The lower part of the formation consists of silt and sandy gravel. The thickness of the formation varies from 90 to 100 feet.

The Ringold Formation at the disposal site consists of lenses (localized pockets) composed of partially consolidated sand and gravel, fine-grained sand, and silt and clay locally cemented by caliche. The Ringold Formation contacts the Hanford formation at approximately 90 to 110 feet beneath the surface. The uppermost part of the Ringold Formation in this area consists of relatively impermeable silt and clay that varies from about 40 feet thick at the northwest corner to about 80 feet thick at the southeast corner of the site. These silts and clays are called the Lower Mud Unit of the Ringold formation. The lower part of the Ringold Formation, below this Lower Mud Unit, consists of an 80- to 120- (approximate) foot-thick zone of silty sandy gravel named Unit A. The natural confined aquifer (also called the uppermost aquifer) below the disposal site is found primarily in this gravel zone. The three groundwater monitoring wells (upgradient: 699-42-37; downgradient: 699-40-36, 699-41-35), installed to monitor disposal activity, penetrate to this aquifer. However, due to the confining properties of the Lower Mud Unit, these wells are no longer used to monitor the disposal activities. This change to the permit

was performed during the 2012 renewal. The facility encountered a minor amount of perched water above the Ringold lower mud unit when installing the three monitoring wells. Recent discharges to the ground at the facility have likely increased the amount of perched water. The static water level in wells completed within the uppermost aquifer currently varies from 116 to 125 feet below the surface. Both the Ringold Formation Lower Mud Unit and Unit A slope gradually to the south-southeast.

Hydrologic and geochemical monitoring at the site has demonstrated that the Lower Mud Unit of the Ringold Formation acts as an effective retardant to movement of overlying water (originating from the infiltration basins) down to the uppermost groundwater aquifer in the Unit A gravels. This phenomenon occurs because the mud unit is highly impermeable, and does not conduct water well. Hence, the presence of the mud unit will naturally reduce water from moving directly downward below the Hanford formation. Water levels in the 216-B-3 Pond vicinity have not shown evidence of the 200 Area TEDF discharges entering the Unit A Gravels. Thus it is interpreted that the effluent follows the top of the lower mud unit to the south until it reaches an area where the lower mud unit dips below the water table. It is thought that this occurs approximately 1,300 to 1,600 feet south of the 200 Area TEDF facility. The Lower Mud Unit also acts to confine the groundwater in the Unit A gravels beneath the site such that it has a positive upward pressure gradient. This upward pressure also impedes the entry of the treated effluent into the aquifer in the immediate vicinity of the disposal facility. Because the Lower Mud Unit restricts the 200 Area TEDF discharges from infiltrating to the uppermost aquifer, groundwater monitoring using the current monitoring wells is not a reliable method of determining contaminant mobility through the soil column to the groundwater.

Groundwater flows down-gradient toward the southwest at a flow rate of less than one foot per day in the uppermost aquifer beneath the 200 Area TEDF. Hydrologic tests and recent head measurements indicate that the groundwater flow is approximately 0.01 feet per day. Groundwater currently flows toward the west to the 216-B-3 Pond complex (located west-northwest of the 200 Area TEDF) with a hydraulic gradient of about 0.0014 foot per foot. Water levels in the area are currently declining at a rate of about 0.02 feet per year, or less.

The Lower Mud Unit of the Ringold formation is absent beneath portions of the main pond, and A and B lobes of the 216-B-3 Pond complex. Consequently, effluent previously discharged to these ponds migrated directly downward into the uppermost aquifer of the Ringold Unit A gravel. The additional volume and down-gradient movement of these B pond discharges contributed to the upward pressure gradient previously observed in the upper-most aquifer beneath the 200 Area TEDF. Since effluent discharges to the main pond, and A and B lobes of the 216-B-3 Pond complex have ceased, the magnitude of the hydraulic head in the aquifer beneath the 200 Area TEDF is gradually decreasing.

USDOE discharged effluent to the 3C expansion pond of the 216-B-3 Pond complex prior to discharge to the 200 Area TEDF, which began in 1997. The proposed permit still allows for emergency overflows to this pond. At this location, the Lower Mud Unit is known to be present. Consequently, the water infiltrating downward from this pond likely did not directly enter the uppermost aquifer. Instead, the water may flow laterally down-gradient along the top of the Lower Mud Unit until it reaches an area where the mud does not exist or is offset by a fault.

The May Junction Fault is located approximately one mile east of the 200 Area TEDF. It trends north-south with the east side displaced vertically downward about 185 feet. It is possible that the fault may hydraulically connect the confined aquifer in the Unit A gravel of the Ringold Formation with water perched in the Hanford formation at the top of the Lower Mud Unit, but it is also possible that mud has smeared along the fault zone sealing the fault and blocking the pathway. Recent research makes it appear likely that the May Junction Fault is an impediment to eastward movement of groundwater in the Ringold (confined) aquifer.

East of the May Junction Fault to the Columbia River, the uppermost aquifer is found in the Hanford formation gravels, with the possible exception of the area east-northeast of Gable Mountain. Geologic processes in this area have resulted in the uppermost aquifer likely occurring in Unit A of the Ringold Formation.

The 200 Area TEDF facility is located approximately six miles west of the Columbia River. Prior to discharge, computer modeling of groundwater flow provided an estimated travel time of approximately 10 to 20 years for effluent discharged at the 200 Area TEDF to reach the Columbia River. Other more recent modeling estimate travel times approaching 120 to 300 years for effluent to reach the Columbia River (PNNL-13032).

The average annual precipitation at the Hanford Site is 6.3 inches. Minor local variations occur. Most of the precipitation occurs during the winter, with nearly half of the annual amount occurring from November through February. Snowfall accounts for about 38% of all precipitation. Days with greater than 0.51 inch of precipitation occur less than 1% of the year.

Projections are that the probable maximum flood on the Columbia River would not encroach within three miles of the 200 Area TEDF Site.

The Hanford Site has been botanically characterized as shrub-steppe. The major plant community in the vicinity of the 200 Area TEDF is Sagebrush/Cheatgrass or Sandberg Bluegrass and Greasewood/Cheatgrass-Saltgrass. USDOE selected the disposal site to avoid impact on historical, archaeological, and cultural resources.

B. Wastewater Characterization

DOE-ORP reported the concentration of pollutants in the discharge in the permit application, publicly available documents, and in discharge monitoring reports. The tabulated data represents the quality of the wastewater discharged from January 1, 2011, to December 31, 2019. The wastewater prior to infiltration is characterized as follows:

Table 2 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
1,1-Dichloroethane	µg/L (micrograms per liter)	32	<0.88	<1
1,2,4-Trichlorobenzene	µg/L	17	<1.03	<1.2
1,4-Dichlorobenzene	µg/L	17	<1.03	<1.2

Table 2 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
2,4-Dinitrotoluene	µg/L	17	<1.03	<1.2
2-Chlorophenol	µg/L	17	<1.03	<1.2
4-Chloro-3-methylphenol	µg/L	17	<1.03	<1.2
4-Nitrophenol	µg/L	17	<1.3	<2.3
Acenaphthene	µg/L	17	<1	<1.2
Aluminum	µg/L	2	804	1500
Arsenic (total)	µg/L	120	1.39	2.93
Barium	µg/L	2	45.6	61.8
Benzene	µg/L	32	<0.86	<1
Beryllium	µg/L	2	<1.0	<1.0
Bis(2-ethylhexyl) phthalate	µg/L	46	1.72	7.35
Bromide	µg/L	64	89	220
Bromodichloromethane	µg/L	59	0.85	3.7
Bromoform	µg/L	59	0.63	<1
Cadmium (total)	µg/L	120	0.164	0.340
Calcium	µg/L	2	33,000	43,400
Carbon Tetrachloride	µg/L	64	0.647	4.0
Chloride	µg/L	124	4700	136,000
Chlorobenzene	µg/L	32	<0.88	<1
Chloroform	µg/L	64	4.79	13.6
Chromium (total)	µg/L	120	0.939	7.12
Cobalt	µg/L	2	<1.0	<1.0
Conductivity (monthly average)	µmho/cm (micromho per cm)	108	186	456
Dibromochloromethane	µg/L	59	0.66	2.0
Fluoride	µg/L	112	63	221
Gross Alpha	pCi/L (picocuries per liter)	123	6.09	24
Gross Beta	pCi/L	123	8.28	35
Iron (total)	µg/L	133	102	1,320
Lead (total)	µg/L	120	0.461	2.73
Magnesium	µg/L	2	6,580	8,400
Manganese	µg/L	71	6.01	20.5
Manganese (total)	µg/L	133	7.58	91.6

Table 2 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Mercury (total)	µg/L	119	0.065	0.53
Methylene Chloride	µg/L	64	1.49	4.81
Nickel	µg/L	2	<1.5	<1.5
Nitrate (as N)	µg/L	123	320	20,400
Nitrite (as N)	µg/L	111	25	220
n-Nitrosodi-n-dipropylamine	µg/L	17	<1.7	<1.7
Oil and Grease	µg/L	46	2290	5700
Pentachlorophenol	µg/L	17	<1.5	<1.5
Phenol	µg/L	17	<1.3	<2.3
Phosphate (as P)	µg/L	101	303	15,100
Potassium	µg/L	2	1710	2,080
Pyrene	µg/L	13	<1	<1
Pyridine	µg/L	4	<2.2	<2.3
Silicon	µg/L	2	2010	2020
Silver	µg/L	2	<1.0	<1.0
Sodium	µg/L	2	33,800	63,800
Sulfate	µg/L	124	21,500	80,100
Thallium	µg/L	2	<5.0	<5.0
Toluene	µg/L	32	<1	<1
Total Dissolved Solids	µg/L	124	116,000	667,000
Total Trihalomethanes	µg/L	64	5.05	16.3
Trichloroethene	µg/L	32	<0.63	<1
Trichloromonofluoromethane	µg/L	1	2.8	2.8
Tritium	pCi/L	40	575	1,200
Vanadium	µg/L	2	<1.0	<1.0
Zinc	µg/L	2	80.9	138
Parameter	**Units**	**Minimum Value**	**Maximum Value**	
pH	Standard Units	6.0	10.1	

C. Summary of Compliance with Previous Permit Issued

The previous permit placed effluent limits on the constituents listed in Table 9.

DOE-ORP has not consistently complied with the effluent limits and permit conditions throughout the duration of the permit issued on July 1, 2012. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on Permittee reports submitted to Ecology upon discovery of noncompliance events.

The following table summarizes the violations that occurred during the permit term.

Table 3 Violations

Parameter	Statistical Base	Units	Value	Limit	Date	Violation
Nitrate (as N)	Daily Maximum	mg/L	20.4	1.24 mg/L	12/5/2012	Numeric Effluent Violation
Chloride	Daily Maximum	mg/L	136	116 mg/L	03/11/2015	Numeric Effluent Violation
Chloroform	Monthly Average	µg/L	8.55	7 µg/L	07/2015	Numeric Effluent Violation
Chloroform	Monthly Average	µg/L	10.9	7 µg/L	02/2016	Numeric Effluent Violation
Chloroform	Monthly Average	µg/L	8.46	7 µg/L	03/2016	Numeric Effluent Violation
Total Dissolved Solids	Monthly Average	mg/L	667	500 mg/L	11/2018	Numeric Effluent Violation
Chloroform	Monthly Average	µg/L	9.4	7 µg/L	02/2019	Numeric Effluent Violation
Iron	Monthly Average	µg /L	301	300 µg/L	07/2019	Numeric Effluent Violation
Manganese	Monthly Average	µg/L	72	50 µg/L	10/2019	Numeric Effluent Violation
Nitrate (as N)	Monthly Average	mg/L	1.06	0.62 mg/L	10/2020	Numeric Effluent Violation

The following table summarizes compliance with report submittal requirements over the permit term.

Table 4 Permit Submittals

Submittal Name	Due Date	Date Submitted	Date Reviewed or Approved
Application for Permit Renewal	06/30/2017	06/28/2016 Updated Application: 12/12/2019	06/24/2017
Operations and Maintenance (O&M) Manual Review Letter	Annually	06/25/2020*	06/29/2020
O&M Manual Update	As Necessary	06/21/2016*	06/22/2016
Noncompliance Notification Report	As Required	11/7/2019*	11/14/2019
Discharge Monitoring Reports	Quarterly	04/26/2021*	04/27/2021
Sampling and Analysis Plan in Support of Effluent Variability Study	Once per Significant New Source	10/28/2019	N/A

*Most Recent Submittal.

D. State Environmental Policy Act (SEPA) Compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

As the lead agency, Ecology performed a threshold determination (SEPA #201105813) of the impacts on the environment prior to reissuance of the previous 200 Area TEDF wastewater discharge permit (Ecology 2012). Had Ecology reissued the 200 Area TEDF permit to impose conditions that are within Federal effluent limits and State rules upon existing discharges only, then the action would have been exempt from SEPA under the State law (RCW 43.21C.0383). The draft permit made a change that alone would have made the action exempt; however, it also included other changes that Ecology determined required a review for a significant environmental impact. Information from the previous permit renewal is included in this Fact Sheet for historical knowledge and public interest.

The previous permit added a new major waste stream composed of non-radioactive liquid waste effluent from various facilities within WTP. WTP is able to treat the effluent to meet the limits in the existing permit. In the previous permit renewal, Ecology added a permit condition that requires the USDOE to perform an Effluent Variability Study and report the results. If the results of that study indicate that the 200 Area TEDF can achieve a lower TDS limit than that set in the permit, Ecology may require performance-based limits during the next permit cycle or may modify the permit during the current permit cycle. Other discharges to the 200 Area TEDF will come from the facilities that appear in the list within the History section of the Fact Sheet.

During the previous permit renewal, Ecology also changed the points of compliance for lead and cadmium from the groundwater wells to the effluent. New points of compliance were necessary because the monitoring wells that the USDOE used for monitoring lead and cadmium concentrations in the groundwater from the 200 Area TEDF were completed in the confined aquifer, isolated from the 200 Area TEDF discharges. As these wells are not effective for monitoring 200 Area TEDF discharges, the USDOE will meet the Federal effluent limits and State rules when the effluent enters the infiltration basins. Groundwater sampling was halted as the wells are not monitoring the correct aquifer.

After reviewing the changes to the previous 200 Area TEDF permit and the impacts on the environment, Ecology determined that the impacts were not significant. Ecology prepared a Determination of Significance in 1993 that documented the results of the review. The proposed permit reauthorizes an existing discharge and does not propose limits any less stringent than those previously approved in 2012, as presented in Table 9. For this reason, an additional SEPA review was not conducted for this permit renewal.

III. PROPOSED PERMIT LIMITS

State regulations require that Ecology base limits in a State Waste Discharge permit on the:

- Technology and treatment methods available to treat specific pollutants (technology-based). Dischargers must treat wastewater using AKART. Ecology has developed guidance describing technology-based AKART criteria for industrial/commercial systems that discharge to ground; (Ecology, 1993; 2004).
- Operations and best management practices necessary to meet applicable water quality standards to preserve or protect existing and future beneficial uses of the groundwaters.
- Ground water quality standards (Ecology 96-02, 1996).
- Applicable requirements of other local, State and Federal laws.

Ecology applies the most stringent of technology and water quality-based limits to each parameter of concern and further describes the proposed limits below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, and monitoring). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and are not listed in regulation.

Ecology does not usually develop permit limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize the discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent. Until Ecology modifies the permit to reflect additional discharges of pollutants, a permitted facility could be violating its permit.

A. Design Criteria

Under WAC 173-216-110(4), flows and waste loadings must not exceed approved design criteria. The 200 Area TEDF design capacity is documented in WHC-SD-W049H-SE-004, Rev. 1, *Site Evaluation Report – Site Screening, Evaluation, and Selection, Project W-049H, 200 Areas Treated Effluent Disposal Bain*, Westinghouse Hanford Company, Richland, Washington. The design capacity for 200 Area TEDF is based on the operation of paired basins with infiltration rates of 20 gallons per day per square foot (gpf^2). Each 5-acre infiltration basin has a capacity of 4,356,000 gallons per day (4.356 million gallons per day [MGD]). Collectively, the 200 Area TEDF has a capacity of 8,712,000 gallons per day (8.712 MGD). The table below includes design criteria from the referenced reports.

Table 5 Design Criteria for the Infiltration Basins

Parameter	Design Quantity
Average Monthly Flow (Maximum Month)	8.712 MGD[a]

[a]The Monthly Average Flow Effluent Limit remains 5.5 MGD and is based on the reported forecasted discharges to the 200 Area TEDF during the term of this permit.

B. Technology-Based Effluent Limits

Waste discharge permits issued by Ecology specify conditions requiring the facility to use AKART before discharging to waters of the state (RCW 90.48).

Ecology approved the following documents:

- HNF-ENG-64305, BAT/AKART Analysis Project L-897, Central Plateau Water Treatment Facility (within B.T Vance, 2019, "Submittal of Supplemental Documents for the State Waste Discharge Permit ST0004502 Renewal Application for the Treated Effluent Disposal Facility," (Letter 19-ECD-0050, to A.K. Smith, Ecology, December 12), U.S. Department of Energy, Richland Operations Office, Richland, Washington).
- WHC-SD-W049H-SE-004, Rev. 1, *Site Evaluation Report – Site Screening, Evaluation, and Selection, Project W-049H, 200 Areas Treated Effluent Disposal Bain*, Westinghouse Hanford Company, Richland, Washington.
- WHC-SD-W049H-ER-003, Rev. 0, *200 Area Treated Effluent Disposal Facility (Project W-049H) Wastewater Engineering Report*, Westinghouse Hanford Company, Richland, Washington.
- The WTP BAT/AKART within Hebdon, J., 2003, "Application for Renewal of State Waste Discharge Permit ST 4502 for the 200 Area Treated Effluent Disposal Facility," (Letter 04-RCA-0003, to K.A. Conaway, Ecology, October 8), U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- WTP BAT/AKART Addendum #1 within Hebdon, J., 2003, "Addendum to Best Available Technology/All Known, Available and Reasonable Treatments (BAT/AKART) Engineering Study," (Letter 04-RCA-0017, to K.A. Conaway, Ecology, November 14), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

- WTP BAT/AKART Addendum #2 within Klein, K.A., 2004, "Updated Information to – Addendum to Best Available Technology/All Known, Available and Reasonable Treatments (BAT/AKART) Engineering Study," (Letter 04-AMCP-0184, to K.A. Conaway, Ecology, March 15), U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- WTP BAT/AKART Addendum #3 within Corey, R, 2011, "Request for Approval to Discharge Waste Treatment and Immobilization Plant (WTP) Commissioning and Operational Discharges to the 200 Area Treated Effluent Disposal Facility (TEDF)," (Letter 11-EMD-0040, to J.A. Hedges, Ecology, March 17), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology determined that the facility meets the minimum requirements demonstrating compliance with the AKART standard if the USDOE operates the disposal system as described in the approved engineering report and any subsequent Ecology approved reports.

See **Appendix D** for the Enforcement Limit Derivation Summary which discusses the rationale for technology-based and groundwater quality-based limits.

USDOE must meet the proposed permit limits in the table below to satisfy the requirement for AKART.

Ecology also evaluated the Engineering Report and BAT/AKART Report for water quality-based requirements, which is described in the next section of the fact sheet.

Table 6 Technology-Based Effluent Limits

Effluent Limits		
Parameter	**Average Monthly**	**Maximum Daily**
Total Trihalomethanes	20 µg/L	---
Methylene Chloride	5 µg/L	---
Cadmium (total)	3 µg/L	---
Chromium (total)	16 µg/L	---
Lead (total)	6 µg/L	---
Chloride	58,000 µg/L	116,000 µg/L
Nitrate (as N)	620 µg/L	1,240 µg/L

C. Groundwater Quality-Based Effluent Limits

To protect existing water quality and preserve the designated beneficial uses of Washington's groundwaters, including the protection of human health, WAC 173-200-100 requires Ecology to condition discharge permits in such a manner as to authorize only activities that will not cause violations of the groundwater quality standards. The goal of the groundwater quality standards is to maintain the highest quality of the State's groundwaters and to protect existing and future beneficial uses of the groundwater through the reduction or elimination of the discharge of contaminants to groundwater [WAC 173-200-010(4)]. Ecology achieves this goal by:

- Applying AKART to any discharge.
- Applying the antidegradation policy of the groundwater standards.
- Establishing numeric and narrative criteria for the protection of human health and the environment in the groundwater quality standards.

Ecology approved the engineering report as noted above in the technology based limits section.

Antidegradation Policy

The state of Washington's groundwater quality standards (GWQS) require preservation of existing and future beneficial uses of groundwater through the antidegradation policy, which includes the two concepts of antidegradation and non-degradation. Antidegradation is not the same as non-degradation (see below).

Antidegradation

Antidegradation applies to the calculation of permit limits in groundwater when background (see below) contaminant concentrations are less than criteria in the GWQS. Ecology has discretion to allow the concentrations of contaminants at the point of compliance to exceed background concentrations but not exceed criteria in the GWQS. Ecology grants discretion through an approved AKART engineering analysis of treatment alternatives. If the preferred treatment alternative predicts that discharges to groundwater will result in contaminant concentrations that fall between background concentrations and the criteria, then the preferred treatment alternative should protect beneficial uses and meet the antidegradation policy. In this case, the predicted concentrations become the permit limits. If the preferred alternative will meet background contaminant concentrations, background concentrations become the permit limits. Permit limits must protect groundwater quality by preventing degradation beyond the GWQS criteria. If discharges will result in exceedance of the criteria, facilities must apply additional treatment before Ecology can permit the discharge.

Non-degradation

Non-degradation applies to permit limits in groundwater when background contaminant concentrations exceed criteria in the GWQS. Non-degradation means that discharges to groundwater must not further degrade existing water quality. In this case, Ecology considers the background concentrations as the water quality criteria and imposes the criteria as permit limits. To meet the antidegradation policy, the facility must prepare an AKART engineering analysis that demonstrates that discharges to groundwater will not result in increasing background concentrations. Ecology must review and approve the AKART engineering analysis.

You can obtain more information on antidegradation and non-degradation by referring to the *Implementation Guidance for the Ground Water Quality Standards (Implementation Guidance)*, Ecology Publication #96-02 (available at https://apps.ecology.wa.gov/publications/SummaryPages/9602.html).

Background Water Quality

Background water quality is determined by a statistical calculation of contaminant concentrations without the impacts of the proposed activity. The calculation requires an adequate amount of groundwater quality data and determining the mean and standard deviation of the data, as described in the *Implementation Guidance*. Following the procedure in the *Implementation Guidance,* Ecology then defines background water quality for most contaminants as the 95 percent upper tolerance limit. This means that Ecology is 95 percent confident that 95 percent of future measurements will be less than the upper tolerance limit. There are a few exceptions to the use of the upper tolerance limit. For pH, Ecology will calculate both an upper and a lower tolerance limit resulting in an upper and lower bound to the background water quality. If dissolved oxygen is of interest, Ecology will calculate a lower tolerance limit without an upper tolerance limit.

Applicable groundwater criteria as defined in chapter 173-200 WAC and in RCW 90.48.520 for this discharge include those in the following table:

Table 7 Groundwater Quality Criteria

Parameter	Units	Groundwater Criteria Maximum
Total Dissolved Solids	mg/L (µg/L)	500 (500,000)
Chloride	mg/L (µg/L)	250 (250,000)
Sulfate	mg/L (µg/L)	250 (250,000)
Nitrate (as Nitrogen)	mg/L (µg/L)	10 (10,000)
pH Minimum/Maximum	Standard units	6.5 – 8.5
Manganese	mg/L (µg/L)	0.05 (50)
Total Iron	mg/L (µg/L)	0.30 (300)
Total Lead	mg/L (µg/L)	0.05(50)
Total Mercury	mg/L (µg/L)	0.002 (2)
Total Chromium	mg/L (µg/L)	0.05 (50)
Total Cadmium	mg/L (µg/L)	0.01 (10)
Tritium	pCi/L	20,000
Gross Alpha	pCi/L	15
Gross Beta	pCi/L	50
Bis (2-ethylhexyl) phthalate	mg/L (µg/L)	0.006 (6)
Carbon Tetrachloride	mg/L (µg/L)	0.0003 (0.3)
Chloroform	mg/L (µg/L)	0.007 (7)
Methylene chloride	mg/L (µg/L)	0.005 (5)

Ecology reviewed the location chosen for the land treatment site and determined that groundwater monitoring is not required. Ecology requires an alternative monitoring method in the permit. Discharges will be monitored at Building 6653 (Outfall 001) and are required to meet groundwater quality criteria as presented in WAC 173-200 and Table 8.

D. Comparison of Effluent Limits with the Previous Permit Issued on July 1, 2012

The July 2012 permit renewal moved the points of compliance for lead and cadmium from the groundwater monitoring wells to the effluent. These new points of compliance were established because the monitoring wells are installed in a confined aquifer and are isolated from the 200 Area TEDF discharges, making them ineffective at monitoring the nature of the effluent following discharge to ground. Therefore, groundwater monitoring at these wells was discontinued. However, the wells will continue to be monitored as part of the 200-PO-1 Operable Unit and site wide surveillance monitoring plan on an annual basis.

The current permit renewal does not include any increased permit limits. However, the draft permit proposes the following limit updates:

- Decrease in average monthly limit for bis (2-ethylhexyl) phthalate from 10 µg/L to 6 µg/L. This reduction aligns the effluent limit with the Groundwater Quality Standard and is consistent with the Implementation Guidance for the Groundwater Quality Standards, Section 6.3.7.3.
- Decrease in the average monthly effluent limit for arsenic (total) from 15 µg/L to 12 µg/L which aligns the limit more closely with the Hanford Site groundwater background level and is consistent with Section 6.3.7.2 of the Implementation Guidance for the Groundwater Quality Standards. The BAT/AKART discharges to the 200 Area TEDF were summarized in the permit renewal application and the maximum arsenic effluent concentration was below the decreased effluent limit.
- Decrease in the average monthly effluent limit for cadmium (total) from 5 µg/L to 3 µg/L, which aligns the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) and is consistent with the Implementation Guidance for the Groundwater Quality Standards, Section 6.3.7.7 and Figure 6.4. Demonstration of overriding public interest has been presented in this Draft Permit.
- Decrease in the average monthly limit for chromium (total) from 20 µg/L to 16 µg/L, which aligns the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) and is consistent with the Implementation Guidance for the Groundwater Quality Standards, Section 6.3.7.7 and Figure 6.4. Demonstration of overriding public interest has been presented in this Draft Permit.
- Allowance of temporary excursions from the effluent limit for iron above 300 µg/L and below 1,104 µg/L as a result of outages of the NLD for up to 4 weeks in length. These excursions are consistent with the Implementation Guidance for the Groundwater Quality Standards Section 6.3.7.2.
- Decrease in the average monthly effluent limit for lead from 10 µg/L to 6 µg/L, which aligns the limit with the WTP BAT/AKART Addendum #3 (11-EMD-0040) and is consistent with the Implementation Guidance for the Groundwater Quality Standards, Section 6.3.7.7 and Figure 6.4. Demonstration of overriding public interest has been

presented in this Draft Permit. This reduction aligns the permit limit with the suggested Quantitation Level (QL) provided in Appendix A, *List of Pollutants with Analytical Methods, Detection Limits, and Quantitation Levels*.

- Allowance of temporary excursions from the effluent limit for pH between 6.0 and 6.5 or 8.5 and 10.5 when monitored continuously, no single discharge exceeds 60 minutes in length and total excursions do not exceed 7 hours and 26 minutes per month. These excursions are consistent with 40 CFR § 401.17 – pH Effluent limitations under continuous monitoring.

If the results of a permit-required Effluent Variability Study show the facility can achieve a lower TDS limit, Ecology may require performance-based limits during the next permit cycle or may modify the permit during this cycle.

Table 8 Comparison of Previous and Proposed Limits

Parameter	Basis of Limit	Previous Effluent Limits		Proposed Effluent Limits		
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Yearly
Arsenic (total)	Technology	15 µg/L		12 µg/L		
Bis (2-ethylhexyl) phthalate	Water Quality-Based	10 µg/L		6 µg/L*		
Cadmium (total)	Technology	5 µg/L		3 µg/L*		
Carbon tetrachloride	Technology	5 µg/L		5 µg/L		
Chloride	Technology	58,000 µg/L	116,000 µg/L	58,000 µg/L	116,000 µg/L	
Chloroform	Water Quality-Based	7 µg/L		7 µg/L		
Chromium (total)	Technology	20 µg/L		16 µg/L*		
Flow	Technology	5.5 MGD		5.5 MGD		2.3 MGD
Iron (total)	Water Quality-Based	300 µg/L		300 µg/L**		
Lead (total)	Technology	10 µg/L		6 µg/L*		
Manganese (total)	Water Quality-Based	50 µg/L		50 µg/L		
Mercury (total)	Water Quality-Based	2 µg/L		2 µg/L		
Methylene chloride	Technology	5 µg/L		5 µg/L		

Table 8 Comparison of Previous and Proposed Limits

Parameter	Basis of Limit	Previous Effluent Limits		Proposed Effluent Limits		
		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Average Yearly
Nitrate (as N)	Technology	0.62 mg/L	1.24 mg/L	620 µg/L	1,240 µg/L	
Total Dissolved Solids	Water Quality-Based	500 mg/L		500 mg/L		
Total trihalomethanes	Technology	20 µg/L		20 µg/L		
Parameter	**Basis of Limit**	**Range**		**Range**		
pH	Water Quality-Based	6.5-8.5 standard units		6.5-8.5 standard units**		

AY = Averaged Yearly

MGD = Million Gallons per Day

* = Enforcement limit is based on Quantitation Limits in Appendix D.

** = Enforcement limit includes an allowance for temporary excursions outside of effluent limit and according to limiting conditions.

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-216-110) to verify that the treatment process functions correctly, the discharge meets groundwater criteria and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and QL on the discharge monitoring report or in the required report.

A. Wastewater Monitoring

Ecology details the proposed monitoring schedule under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The effluent is monitored at Sampling Station 6653. A composite sampler and continuous meters for pH, conductivity, and flow are at this location. The composite sampler is used to collect 24-hour composite samples of the discharge. The composite sampler distributes the composite sample equally into eight 2-L bottles rather than a single large container. This method is sufficient for this permit.

During periods when the discharge at the 200 Area TEDF is below 50 gpm, the pump that recirculates a portion of the stream through the pH and conductivity meters stops to protect the recirculation pump from damage. In this situation, grab samples are collected daily and analyzed for pH and conductivity. The pH and conductivity elements are installed in low points in the recirculation pipeline so they remain wetted even when there is no recirculation flow. This protects the elements from possible damage from drying. The flowmeter is located on the main pipeline to the 200 Area TEDF.

B. Groundwater Monitoring

There are no wells in place to effectively monitor the 200 Area TEDF discharges to groundwater, so monitoring of the effluent takes place just prior to discharge. Groundwater wells continue to be monitored as part of the 200-PO-1 Operable Unit and site-wide surveillance monitoring plan on an annual basis, but are not required by the proposed permit to be used for monitoring 200 Area TEDF discharges. Section III.D provides additional discussion on groundwater monitoring for the 200 Area TEDF.

Currently, no groundwater monitoring takes place at the 200 Area TEDF.

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-216-110).

B. Operations and Maintenance

Ecology requires dischargers to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state regulations (WAC 173-240-080 and WAC 173-216-110). The facility must maintain a copy of an O&M manual for the wastewater facility.

Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit and ensures the facility provides AKART to the waste stream.

Ecology has determined that because the 200 Area TEDF is not a treatment facility and is not operated on a daily basis, work records used when maintenance is performed at the 200 Area TEDF are compliant with the requirement in Special Condition S4 to "keep a daily operation logbook."

C. Solid Waste Control Plan

The 200 Area TEDF could cause pollution of the waters of the state through inappropriate disposal of solid waste. The proposed permit requires this facility to maintain a solid waste control plan designed to prevent solid waste from causing pollution of waters of the state (RCW 90.48.080). The 200 Area TEDF employs the Washington River Protection Solutions' site-wide waste management document, titled Waste Management Basis, as a Solid Waste Control Plan for managing solid wastes generated during maintenance activities. Types of waste covered by this document include radioactive, mixed, hazardous, dangerous, transuranic, polychlorinated biphenyl, non-regulated, universal and recycle waste as these wastes are

managed at the Hanford Site. None of these wastes are generated or authorized for disposal at the 200 Area TEDF. In the event improper disposal of solid wastes does occur at one of the generating facilities, the Waste Management Basis document contains procedures for minimizing impacts to the 200 Area TEDF. These procedures are also maintained in the 200 Area TEDF O&M manual.

Ecology may review and approve proposed revisions or modifications to procedures that govern solid waste (as defined by WAC 173-303-016) in the Solid Waste Control Plan (as required in Special Condition S5.C) by identifying, reviewing and either approving, commenting on or disapproving revisions or modifications to waste management procedures subject to WAC 173-303 that are incorporated within the O&M Manual.

D. Nonroutine and Unanticipated Wastewater

Occasionally, this facility may accept wastewater that was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. Examples of activities that generate nonroutine and unanticipated wastewater include pressure testing storage tanks, maintaining fire systems, and maintaining drinking water systems.

The permit authorizes the discharge of non-routine and unanticipated wastewater under certain conditions. The facility must characterize these wastewaters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater prior to discharge.
- Require the facility to reuse the wastewater.

E. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Clean Water Act (CWA) and RCW 90.48.080].

The 200 Area TEDF developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit does not require the facility to develop a Spill Control Plan because each generating facility that is authorized to discharge to the 200 Area TEDF is required to maintain an emergency response plan in accordance with WAC 173-303-350.

F. Best Management Practices

Best management practices (BMPs) are the actions identified to manage and prevent contamination of groundwater and stormwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage.

G. Effluent Variability Study

Special Permit Condition S9 requires an effluent variability study be conducted in at least two seasonal phases (winter and summer) during initial testing and the first year of operational discharges to the 200 Area TEDF for each Significant New Source. A Significant New Source is a new discharge to 200 Area TEDF, which may not be fully characterized through sample analysis or process knowledge and may have a measurable impact on the 200 Area TEDF effluent. The 200 Area TEDF will determine which new streams are significant. The facility will contact Ecology when it identifies a Significant New Source discharge. If the facility is not certain if a new discharge is considered a Significant New Source, it must contact Ecology for a determination.

Effluent Variability Studies will consist of the following minimum requirements; the facility must:

- Collect weekly flow-composited samples for metals, anions, and TDS (if the collection of flow-composited samples isn't possible, grab samples may be collected).
- Collect five random grab samples per month and analyze for semi-volatile organics, volatile organics and oil and grease.
- Continuously monitor pH, conductivity, and flow.
- Provide statistical evaluators such as the mean concentration, upper 95% confidence level, standard deviation, and coefficient of variation (or their equivalent).

These studies must be conducted over the course of one calendar year and monitoring results submitted for any significant new source discharge quarterly with Discharge Monitoring Reports. A final summary report must be provided with the results of the evaluation and any relevant or new information or recommendations to Ecology within one year of completion of the study. Ecology will use the report information and results to verify and/or modify the highest allowable concentrations for the discharge limits of the listed constituents in the effluent. Ecology may develop performance-based limits using the results of these studies.

The facility may apply to Ecology for a permit modification if the results of this study provide new information, which they were not aware of when submitting the original application.

WTP generates non-radioactive liquid waste streams that discharge to 200 Area TEDF. An engineering study has determined several of these waste streams cannot be fully characterized prior to their initial discharge to the 200 Area TEDF. Therefore, Ecology required the Permittee to submit a Sampling and Analysis Plan and Statistical Evaluation Plan for review.

Specific objectives of the statistical evaluation include:

- Determining the overall variability of permitted constituents,
- Evaluating comparability of grab and composite samples, and
- Determining if concentrations of permitted constituents vary with season.

Results of the statistical evaluation will be used by Ecology to verify and/or to modify permit limits of the listed constituents in the effluent if needed. If conditions warrant, Ecology will issue an administrative order or permit modification to the Permittee to modify monitoring or other permit requirements. The results could also be used by the Permittee to support a request for reduction in monitoring requirements where the requirements appear to be unnecessarily redundant or too extensive.

New waste streams from the WTP will originate at the following facilities:

- Pretreatment Facility.
- Low Activity Waste Facility.
- Analytical Laboratory.
- High Level Waste Facility.
- Water Treatment Building, Steam Plant Facility.
- Chiller/Compressor Plant.
- Wet Chemical Storage Facility.
- Maintenance Shop.
- Pretreatment Chiller Plant and Cooling Tower.
- A Cooling Tower Facility.

A waste stream from the RO Plant is proposed to be added to the permit. The RO permeate will follow the same route as the future WTP waste streams listed above and is proposed as a temporary discharge to the 200 Area TEDF. See section II.A of this Fact Sheet for more information.

Discharges from all of these facilities will flow into the NLD Tank prior to discharge to the 200 Area TEDF.

H. General Conditions

Ecology bases the standardized general conditions on state law and regulations. They are included in all individual industrial State Waste Discharge permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for groundwaters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state regulations.

B. Proposed Permit Issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Mission Support Alliance

November 2019. BAT/AKART Analysis Project L-897, Central Plateau Water Treatment Facility. HNF-ENG-64305, Revision 0. (https://pdw.hanford.gov/document/AR-03358)

Pacific Northwest National Laboratory

May 2000. Groundwater Monitoring Plan for the Hanford Site 200 Area Treated Effluent Disposal Facility. PNNL-13032. (https://pdw.hanford.gov/document/D1659887)

United States Department of Energy

June 1997. Hanford Site Background: Part 3, Groundwater Background. DOE/RL-96-61, Rev. 0. (https://pdw.hanford.gov/document/D197226378)

October 2003. The WTP BAT/AKART (24590-CM-HC4-HKYP-00001-01, Rev. 02D) within Hebdon, J., "Application for Renewal of State Waste Discharge Permit ST 4502 for the 200 Area Treated Effluent Disposal Facility," (Letter 04-RCA-0003, to K.A. Conaway, Ecology). U.S. Department of Energy, Richland Operations Office, Richland, Washington. (https://pdw.hanford.gov/document/D3112843)

November 2003. WTP BAT/AKART Addendum #1 within Hebdon, J., "Addendum to Best Available Technology/All Known, Available and Reasonable Treatments (BAT/AKART) Engineering Study," (Letter 04-RCA-0017, to K.A. Conaway, Ecology, November 14). U.S. Department of Energy, Richland Operations Office, Richland, Washington. (https://pdw.hanford.gov/document/D3408781)

March 2004. WTP BAT/AKART Addendum #2 within Klein, K.A., "Updated Information to – Addendum to Best Available Technology/All Known, Available and Reasonable Treatments (BAT/AKART) Engineering Study," (Letter 04-AMCP-0184, to K.A. Conaway, Ecology, March 15), U.S. Department of Energy, Richland Operations Office, Richland, Washington. (https://pdw.hanford.gov/document/D4398943)

March 2011. WTP BAT/AKART Addendum #3 within Corey, R, "Request for Approval to Discharge Waste Treatment and Immobilization Plant (WTP) Commissioning and Operational Discharges to the 200 Area Treated Effluent Disposal Facility (TEDF)," (Letter 11-EMD-0040, to J.A. Hedges, Ecology, March 17), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

April 1995. Teynor, T.K., 1995, "Completion of Hanford Federal Facility Agreement and Consent Order Interim Milestone M-17-08," (external letter 95-LEP-034 to D.R. Sherwood, U.S. Environmental Protection Agency and R.F. Stanley, State of Washington Department of Ecology, May 31), U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Washington State Department of Ecology

1993. *Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems*, Ecology Publication Number 93-36. (https://apps.ecology.wa.gov/publications/summarypages/9336.html)

Laws and Regulations. (https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking)

Permit and Wastewater Related Information. (https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-permits)

Revised October 2005. *Implementation Guidance for the Ground Water Quality Standards,* Ecology Publication Number 96-02. (https://apps.ecology.wa.gov/publications/SummaryPages/9602.html)

July 2018. *Permit Writer's Manual*, Publication Number 92-109. (https://apps.ecology.wa.gov/publications/summarypages/92109.html)

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024. (https://apps.ecology.wa.gov/publications/SummaryPages/0710024.html)

November 2004. *Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen*, Ecology Publication #04-10-081; (https://apps.ecology.wa.gov/publications/summarypages/0410081.html)

June 2012. *State Waste Discharge Permit ST0004502 (200 Area Treated Effluent Disposal Facility)*, Ecology Letter, 12-NWP-090. (https://pdw.hanford.gov/document/0092489)

November 2013. *State Waste Discharge Permit ST0004511 (Miscellaneous Streams)*, Ecology Letter, 13-NWP-099. (https://pdw.hanford.gov/document/0087181)

May 1995. Wilson, M., 1995, "State Waste Discharge Permit No. ST4502 for the 200 Area Treated Effluent Disposal Facility (W049-H)," (letter to J. Wagoner, U.S. Department of Energy, Richland Operations Office, April 18), State of Washington Department of Ecology, Kennewick, Washington.

Westinghouse Hanford Company

July 1992. WHC-SD-W049H-SE-004, Rev. 1, *Site Evaluation Report – Site Screening, Evaluation, and Selection, Project W-049H, 200 Areas Treated Effluent Disposal Bain*, Westinghouse Hanford Company, Richland, Washington. (https://pdw.hanford.gov/document/E0022554)

August 1992. WHC-SD-W049H-ER-003, Rev. 0, *200 Area Treated Effluent Disposal Facility (Project W-049H) Wastewater Engineering Report*, Westinghouse Hanford Company, Richland, Washington. (https://pdw.hanford.gov/document/E0022604)

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APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the 200 Area TEDF. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on February 20, 2022 in the Tri-City Herald to inform the public and to invite comment on the proposed draft State Waste Discharge permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period.
- Tells how to request a public hearing of comments about the proposed State Waste Discharge permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting*, which is available on our website at https://ecology.wa.gov/About-us/How-we-operate/rulemaking/Rulemaking-FAQ.

You may obtain further information from Ecology by telephone, (509) 372-7950, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Richland Field Office
3100 Port of Benton Boulevard
Richland, WA 99354

The primary author of this permit and fact sheet is Joseph Lippold.

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APPENDIX B—YOUR RIGHT TO APPEAL

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Pollution Control Hearings Board
1111 Israel Road SW
STE 301
Tumwater, WA 98501

Mailing Addresses

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

Pollution Control Hearings Board
PO Box 40903
Olympia, WA 98504-0903

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APPENDIX C—GLOSSARY AND ACRONYMS

AEA	Atomic Energy Act
AKART	All known, available, and reasonable methods of prevention, control and treatment
AADF	Annual Average Design Flow
AY	Average Yearly Flow
BAT	Best available technology
BMPs	Best management practices
BOD_5	Five-day Biochemical Oxygen Demand
CWA	Clean Water Act
DF	Dilution factor
GWQS	Groundwater Quality Standard (WAC 173-200-040).
MDDF	Maximum day design flow
MMDF	Maximum month design flow
MWDF	Maximum week design flow
MDL	Method detection level
NPDES	National pollutant discharge elimination system
NLD	Non-radioactive liquid waste disposal
PHDF	Peak hour design flow
PIDF	Peak instantaneous design flow
PSIU	Potential significant industrial user
POTW	Publicly owned treatment works
QL	Quantitation level
SEPA	State Environmental Policy Act
SIU	Significant industrial user
TEDF	200 Area Treated Effluent Disposal Facility
TDS	Total dissolved solids
TMDL	Total maximum daily load
TSS	Total suspended solids
USDOE	United States Department of Energy
USDOE-ORP	United States Department of Energy, Office of River Protection
USDOE-RL	United States Department of Energy, Richland Operations Office
WAC	Washington Administrative Code
WTP	Waste Treatment and Immobilization Plant

Acute toxicity -- The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow -- average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit -- The average of the measured values obtained over a calendar month's time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar month's time.

Average Monthly Flow -- The highest allowable average of the daily discharges to the 200 Area TEDF over a calendar month, calculated as the total gallons discharged during a calendar month, divided by the number of days in that month.

Average Yearly Flow -- The highest allowable average of the daily discharges to the 200 Area TEDF over a calendar year, calculated as the total gallons discharged during a calendar year, divided by the number of days in that year.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best Available Technology -- The HFFACO further requires that the best available technology that is economically achievable be applied to the effluent. An extensive engineering report (WHC-SD-W049H-ER-003) describes all of the source controls, technology improvements, operational changes, and treatment technologies applied at all of the original facilities discharging to the 200 Area TEDF to clean up the effluent and reduce its volume.

Best management practices -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

Best engineering practices -- For calibration of flow measurement, field measurement, and continuous monitoring devices as described in Special Condition S2.D, best engineering practices are the procedures and frequencies specified in the permittee's pH, conductivity and flow calibration procedure documents maintained in the 200 Area TEDF O&M Manual.

BOD_5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a publicly owned treatment works (POTW) by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; U.S.C. 1251 et seq.

Compliance inspection-without sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Daily Sampling Frequency -- One sample taken within a 24 hour period from the time (to the nearest minute) when continuous monitoring at the 200 Area TEDF becomes not possible. Subsequent daily samples must be taken within 24 hours of the first daily sample.

Date of receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal coliform bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's National pollutant discharge elimination system (NPDES) permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act [RCRA], and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act,

the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Detection Limit.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow -- The maximum anticipated instantaneous flow.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user -- A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer. (64 Federal Register (FR) 30417). ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Quantify Daily Flow -- The total of all flows from all contributing facilities authorized to discharge to the 200 Area TEDF, that are summed together to determine the total flow to the 200 Area TEDF in a 24 hour period (day). The day begins at the time (to the nearest minute) when continuous monitoring becomes not possible. Subsequent days will begin at the time (to the nearest minute) that the first day ended. When continuous monitoring is restored in the middle of a day, the quantified flows from the beginning of that day will be summed with the continuous monitoring data up until the end of that same day.

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or

have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Ringold Formation -- The 200 Area TEDF is underlain by geologically young sediments that, in turn, are underlain by bedrock. The bedrock is Columbia River Basalt, at a depth of about 250 feet below the surface. The bedrock slopes gently (approximately one-half of a degree) toward the south-southwest. The sediments that lie immediately above the basalt are called the Ringold Formation.

Sample Maximum -- No sample may exceed this value.

Significant industrial user --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

   Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

   *The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 µm filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids -- That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load -- A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids -- Total suspended solids (TSS) is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

APPENDIX D—TECHNICAL CALCULATIONS

Enforcement Limit Derivation Summary

Constituent or Characteristic	Enforcement Limit	Point of Compliance	Type of Limit	Rationale/ Method of Derivation
Bis (2-ethylhexyl) phthalate	6 µg/L	Effluent	Water quality-based	Limit set at GWQS and enforceable at the practical quantitation limit (PQL)
Total trihalomethanes	20 µg/L	Effluent	Technology-based	Limit set to BAT/AKART discharges.
Carbon tetrachloride	5 µg/L	Effluent	Technology-based	Limit set to BAT/AKART discharges.
Chloroform	7 µg/L	Effluent	Water quality-based	Limit set at criteria.
Methylene chloride	5 µg/L	Effluent	Technology-based	Criteria met. Limit set at PQL, which also happens to be the criteria.
Arsenic	12 µg/L	Effluent	Water quality-based	Background groundwater value is greater than the Groundwater Quality Standard (GWQS; WAC 173-200-040). Limit set at Hanford Site background concentration. Limit is enforceable at the PQL.
Cadmium	3 µg/L	Effluent	Technology-based	Limit set to BAT/AKART discharges. Limit is enforceable at the PQL.
Chromium	16 µg/L	Effluent	Technology-based	Limit set to BAT/AKART discharges. Limit is enforceable at the PQL.

Constituent or Characteristic	Enforcement Limit	Point of Compliance	Type of Limit	Rationale/ Method of Derivation
Iron	300 µg/L	Effluent	Water quality-based	Background groundwater value is greater than the Groundwater Quality Standard (GWQS; WAC 173-200-040). Limit set to BAT/AKART discharges/GWQS. Limit is enforceable at the PQL.
Lead	6 µg/L	Effluent	Technology-based	Limit set to BAT/AKART discharges. Limit is enforceable at the PQL.
Manganese	50 µg/L	Effluent	Water Quality Based	Background groundwater value is greater than the Groundwater Quality Standard (GWQS; WAC 173-200-040). Limit set to BAT/AKART discharges/GWQS. Limit is enforceable at the PQL.
Mercury	2 µg/L	Effluent	Technology-based	Criteria met. Limit set at PQL.
Chloride	58 mg/L	Effluent	Technology-based	Criteria met. Limit set at as low a level as source and technology controls can achieve.
Nitrate (as N)	620 µg/L	Effluent	Technology-based	Criteria met. Limit set at as low a level as source and technology controls can achieve.
Total dissolved solids	500 mg/L	Effluent	Water quality-based	Limit set at criteria.
pH, in pH units	6.5 to 8.5	Effluent	Water quality-based	Criteria met. Range provided due to natural variability in groundwater.

APPENDIX E—RESPONSE TO COMMENTS

[Ecology will complete this section after the public notice of draft period.]